

OCTOBER 20.

The President, SAMUEL G. DIXON, M.D., in the Chair.

Twenty-three persons present.

*Inclusions in Quartz.*—MR. HUGO BILGRAM remarked that on examining a section of the "Blue Quartz" of Bucks county, Pennsylvania, he had observed some very interesting inclusions. This quartz contains small crystals of a bluish tint, exceedingly small needle-shaped crystals, some apparently opaque, and larger and smaller amorphous black masses distributed in irregular groups, mostly in sheets throughout the rock, probably consisting of graphite. There are also numerous small cavities filled with liquid, probably water, containing small bubbles. A few of these latter cavities were found to contain small, loose particles which, in connection with the enclosed bubbles, exhibit the phenomenon known as the Brownian movements. Some are prismatic crystals or fragments, others opaque particles of irregular shape. These inclusions clearly demonstrate that the Brownian movements continue indefinitely, the gneiss beds from which the blue quartz originates belonging to the oldest geologic formations.

Some of the cavities contain a number of such crystals. Owing to the constant movement it was difficult to count them with certainty, but he had counted no less than five or six particles in several cavities.

These inclusions of suspended particles seem to be very rare, as he had examined hundreds of splinters and had succeeded in finding only a few exhibiting these phenomena. They seemed to be grouped. If one cavity containing a loose crystal is found in a section, it is likely that more can be discovered by a close examination. The first section in which he discovered them contains at least twenty such cavities. The dimensions of the particles are exceedingly small. One of the largest prismatic crystals found is about 6 micro-millimeters long and about  $\frac{1}{3}$  micro-millimeter thick. Others are too small for even approximate measurement.

MR. FRANK J. KEELEY stated that he had succeeded in showing that these crystals have double-refractive qualities. By placing the section between two Nicol's prisms, so as to obtain a dark field, a careful observation will reveal that these crystals occasionally light up as their optic axis happens to become practically paralleled with the line of sight. They look very much like fireflies.

Messrs. Theodore Brooks, Allen J. Smith, Frederick J. Lowton, Thomas Barbour and Edward G. Vanatta were elected members.

The following were accepted for publication: